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Co-designing a diversity of social media products with and for older people

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Co-designing a diversity of social media products with and for older people

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ABSTRACT

Social media products and services have the potential to address issues of social isolation in later life, when social contact often declines. However, issues of accessibility, functionality and control appear to deter the use of existing systems by some parts of the older population. In this paper, we describe a literature review and co-design exploration to understand and address these issues. Using a methodology we call Focusgroup+, we presented new product concepts to both digitally engaged and digitally unengaged groups of older people for critique and re-design. The concepts were based on familiar devices and included a *Photo Phone* concept for multimedia communication, a *TV Talk* concept for social TV, and a *Twitter Well* concept for broadcast text messaging. Findings from the re-design exercise show that groups responded differently to the same concepts based on their existing skills and equipment, and took them in different design directions to accommodate common preferences for meaningful communication with relatively small groups of key contacts. This led to a diversity of both appliances and apps that better reflected the diversity of participants themselves.

CCS Concepts

General and reference ~Design • Human-centered computing
~Participatory design • Human-centered computing
~Accessibility design and evaluation methods • Human-centered computing
~Collaborative and social computing devices

Keywords

Co-design; social networking; social communication; older people; accessibility, Focusgroup+; social isolation.

1. INTRODUCTION

The increasing uptake of social media technologies such as online social networking, internet telephony and interactive television are changing the way people communicate and interact with each other. These different media technologies are enabling people to connect and share experiences in new ways. Although the use of such technologies is often targeted towards younger people, there is an increasing awareness that older people could potentially benefit from the use of social media technologies by helping them live independently through life transitions such as losing contact with friends or family through bereavement, retirement or relocation.

However, social media technologies are often accessed through internet devices such as computers, tablets and mobile phones. This creates a number of accessibility issues for older people who experience physical, sensory and cognitive decline with ageing, and may struggle to afford or operate digital technology [4]. Problems reported by older people include handling and reading small buttons and text, too many functions and features, and unnecessary menus that are hard to navigate and understand [9, 12, 14]. Research also shows that prior experience with old technology affects how older people interact with new technology and ICT devices [1, 15]. Even for those who have the requisite access and skill sets, the style of use and openness of online information sharing may not be considered appropriate.

In this paper, we report the findings of an attempt to understand and address these problems by involving and working with groups of older people in the early phases of digital product design. This was done through two creative co-design workshops or ‘Sandpits’ intended to give older participants a voice and role in specifying requirements for new and emerging ICTs. In these sandpits, we introduced the issue of social communication to stimulate a discussion of current practice, before describing three new product concepts based on familiar devices. These concepts were embodied as semi-working physical prototypes whose proposed functionality was demonstrated to participants for verbal feedback and critique. Participants were then split into three smaller groups of about 3, facilitated by an additional design researcher, and challenged to re-design one of the demonstrated concepts. Sub-groups then presented

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their new designs back to the broader group for further critique and feedback. The design conversations and outputs of these groups were not taken as ‘solutions’ to the problem of social media accessibility and acceptability. Rather they were treated as reflections of core attitudes to this class of technology and preferences for solutions of various types.

The study was carried out in the context of the SUS-IT project, which examined ways of helping older people to engage and stay engaged with new information and communication technology as they age [2]. While other parts of the project examined the training and use of existing ICTs, this part concerned the innovation of new technology with older people themselves. In previous papers we have described attempts to co-design ICT products and services supporting memory and identity in older people, and aspects of the co-design method we refer to as Focusgroup+ [5, 16]. In this paper, we report the findings of this method applied to social media products and their implications for future research and development in this area. We begin with a review of related work before describing the methods, findings and implications respectively.

2. RELATED WORK

Four kinds of literature characterize related work in this field. These include **reviews** of theoretical or empirical work on designing with and for older people, **questionnaire surveys** on internet and social media use by older people, **interview surveys** on communication practices and attitudes by older people, and new technology **interventions**. Key studies and insights from each of these areas are summarized briefly below.

In an excellent **review** of ‘Designing for elders’, Lindley et al. [17] contrast understandings from gerontology and human computer interaction regarding relationships in later life. This allows them to make a strong distinction between the dynamics of family versus friendship relationships. Friendships remain essentially symmetrical throughout life with an expectation that they will involve reciprocal contributions and support wherever possible. Maintaining a small number of close friendships is valued over forging new friendships and having a large social network. In contrast, family relationships are essentially asymmetrical and flip over time, with young children being dependent on their parents until adulthood, but parents becoming more dependent on their children in older age. Older people value their independence and privacy, and are more interested in monitoring the activities of their children than being monitored by them. They are likely to resist ‘care systems’ until absolutely necessary, and will remain interested in maintaining hobbies and other activities outside the family as well as contributing to family life for as long as possible.

In a related review, Wherton et al. [28] promote co-design with older people themselves as a way of ensuring that these values are carried forward into technologies for social connection. They flag inconclusive evidence for the effect

of communication technologies on alleviating loneliness and recommend a need for new and better ICT solutions with greater involvement of older people themselves. A number of co-design methods are mentioned, together with two example interventions by Garatinni et al [8] and Lindley et al. [19] that we review below.

Telephone, postal and online **questionnaire surveys** on the use of ICT and social media by older people generally find that use is radically lower compared with younger people and declines further with age. For example, recent 2016 figures on UK internet use from the Office of National Statistics show that 90% of 16-24 year olds use online social networking systems, whereas this figure falls to 51% of 55-64 year olds and 23% of over 65s [20]. Related reports from advocacy groups for older people point out the potential of online communication to address loneliness and social isolation, and recommend campaigns to promote existing technology more effectively [e.g. 11, 21].

Further clues on the *reasons* for lower use by older people are provided in an academic review of the questionnaire literature and new data from Slovenia [25]. They point to a variety of factors including those related to age, gender, living arrangements, education and critical mass. Decreasing physical and mental abilities with age make it harder to use ICTs in older age. Men are bigger users than women in general, as are people living with others and able to access help in purchasing and maintaining technology. Knowledge of new technology and what it offers is lower in older age groups, and there is a bootstrapping problem of finding enough social contacts to interact with online. In the new data from Slovenia, Facebook was the most popular social networking site used by 44% of the 54 older internet users in the sample, closely followed by Skype which was used by 42%. The main motivation for using these systems was to keep in touch with existing family and friends, rather than seeking new friends or partners.

More detailed insights into existing communication attitudes and practices by older people are provided by several **interview surveys**, designed to identify requirements for new social media systems for this group. These range from interviews with three older people combined with cultural probe diaries [22] and the reporting of portraits of two older people as intense users of ‘constant contact media’ [24], to a series of 22 in-home interviews [10] and a trio of focus groups [18]. Taken together, the studies are useful in highlighting the fact that older people are increasingly aware that their time is limited and they wish to spend it on meaningful rather than frivolous relationships which do not intrude on the privacy of others [10, 18]. They need simpler ways of coordinating existing connections and mitigating the negative effects of online communication [10, 18, 24]. Specific requirements were also identified to support intergenerational contact with grandchildren, reminiscing, remote learning, and the incorporation of material means of communication such as printed photographs [10, 24].

Finally, a number of **technology interventions** are instructive in expanding these insights and pointing towards promising new design possibilities. For example, in a simple trial of an existing social network in Finland with 8 older people, [13] found resistance to use. This was due to skepticism of the value of broadcasting personal details to a network and confusion about privacy policies of who could see what. The *Wayve* touch-screen message board from Lindley et al. [19] had more success as a vehicle for playful interaction with teenage grandchildren, through scribble messaging and the exchange of photographs and text messages. This was echoed by two studies of remote photo and text messaging on an iPad app called *Enmesh*, within a community of older people [26] and between older people and their professional carers [27]. The touch-based interface made it easy for users to create content which was useful for both deepening social engagement and fostering self-expression. In a twist on this system, [23] designed a *Tap and play* photograph album that could be populated with printed photographs and spoken commentary. This was used by an extended family to create a 105th birthday gift for Alice, who then used it enthusiastically to record further personal memories of her life. In a different approach, [8] explored the use of an audio conferencing system called *Building Bridges* by 19 older adults, for chatting about audio and video broadcasts from the web. This helped some users make friends online which they later met offline.

Although promising, none of these intervention systems were designed with older people themselves. In the rest of the paper we follow the advice of Wherton et al. [28] to involve older people much earlier in the design process. Building on the insights above, we proposed three novel product concepts for keeping in touch with family and friends based on familiar technologies, for critique and re-design by a diversity of older adults.

3. FOCUSGROUP+ METHODOLOGY

We recruited a total of 18 retired older people ranging from 61 to 80 years of age to participate in two one-day Sandpits in mid-November 2011. The Sandpits were held at North Place Day Centre in Guildford, UK. Participants were recruited on the basis of their internet PC ownership and use, and separated into ‘PC’ and ‘Non-PC’ groups. PC members were those owning and using a home PC at least three times a week, while Non-PC members were those who did not own or use a home PC. There were 10 participants in the PC group and 8 in the Non-PC group. In previous work we found that this crude classification tended to reflect digital engagement and unengagement more generally, creating older people’s groups with somewhat opposing perspectives and experience of digital technology [16, 3]. This polarisation allowed us to assess the influence of digital engagement on attitudes to the proposed concepts and involvement with the creative design process. In general, we felt that this reflected the diversity of older people’s ICT use more fairly than current stereotypes suggest, especially by

including experienced users of the internet in our PC group [7].

In each Sandpit, we organised a morning session that began with a short discussion session to understand and explore participants’ current practice in maintaining relationships and using communication technology. This was followed by a demonstration of 3 product concepts showing various ways in which technology could facilitate communication with family, friends and others. Participants were given the opportunity to discuss the concepts after each demonstration. At the end of all three demonstrations, they were asked for their preferences on a ranking form.

After lunch, participants were split roughly into three sub-groups corresponding to each concept. Each group was facilitated by a university-based designer who led an activity we called “Keep, Lose, Change”. Participants were encouraged as a group to decide on what they liked about the original concept and wanted to preserve (Keep), what they disliked and wanted to drop (Lose), and what else they would like it to do differently (Change). In this activity, participants could disagree with the suggested design changes and negotiate a shared solution for the group. Eventually, each sub-group was encouraged to settle on a new product concept for presentation and discussion back in the wider group. The role of the facilitator was important to this process. We took a conscious decision to play an active part in *co-designing* the revised concepts with participants, but without leading the suggestions. In practice this amounted to playing a sketching role to illustrate new product forms, and applying technical knowledge about the feasibility of implementing participant suggestions [5].

4. SOCIAL MEDIA PROTOTYPES

Our three product concepts were based on insights from a review of the literature, and a desire to create novel functionality based on familiar devices to people over 60 [15]. Thinking about different classes of social media systems and devices for accessing them, we decided to support photo-based communication through a telephone, live media sharing through a TV, and text-based messaging through a typewriter-like keyboard. After refining a number of possible ideas, we finally settled on the following product concepts, realised as physical mock-ups for demonstration. Each prototype appeared to work in a live demonstration using simulated media content and interaction. Hence the following descriptions were read aloud to participants in both sandpits, prior to a demonstration of their functionality.

Concept 1. Photo Phone. *Sharing photographs often takes place face to face. In the past this was usually done with printed photos or slide shows. Today it might include showing images on the screen of a camera, mobile phone or computer. But what if the person you want to share with is a long distance away? Photo Phone is a telephone with a photo display built into it. You can use it as an electronic photo frame most of the time, and also as a regular telephone. But occasionally you can call someone to share the displayed photographs with a distant friend or family member who has a similar phone or computer. You can scan*

a printed photograph into it for sharing, or insert a card from a digital camera. The selected image will automatically appear on your friends' phone or computer once they answer your call. You can then both chat and point to the image as if you are sitting next to each other. You can even leave a photo-voice message if your friend is not around to answer your call.



Figure 1. Photo-Phone

Concept 2. TV Talk. Have you ever watched a TV programme and wanted to share the experience with distant family or friends? Today you could call them up to tell them it is on, and maybe call them back later to discuss it. But what if you could watch and talk about a programme at the same time, through the television itself? **TV Talk** allows you to do this by speaking into the remote control. The remote control allows you to invite others with the same system to join you in watching your programme. It could also show what channels your friends are currently watching and allow you make a request to join them. Once a link is established on the same programme, you can chat about it through the remote control. For example, imagine celebrating together when your favourite team scores a goal, or discussing who you would vote for on *Strictly Come Dancing*. If you get bored of the TV, you can also play games together on a games channel.



Figure 2. TV talk

Concept 3. Twitter Well. Young people are increasingly using computers and mobile phones to tell each other what they are doing in short text messages. These are called 'status messages' and are little more than a sentence long. Systems such as Facebook and Twitter circulate these messages to everyone in the same group of friends. To keep up to date with your grandchildren or friends, it might be useful to read and contribute to this kind of discussion in a very simple way. **Twitter Well** is a set of test tube displays representing the text messages from a few close friends or family members, together with a special keyboard for writing back. Each test tube shows the last text message

entered by the corresponding person on Twitter, and can be tilted to show previous messages. New messages are displayed automatically and make the test tube glow until it is picked up. To respond to a message, you place the test tube in a kind of ink well or holder linked to a keyboard. Your message appears on a keyboard display and can be sent to the individual or group at the press of a button.



Figure 3. Twitter Well

5. RESULTS

5.1 Redesign of Photo Phone

Photo Phone was the most popular concepts in both groups, with 63% of Non-PC and 70% of PC participants saying they would buy it. The main reason for its' popularity was the simplicity of inputting physical or digital photographs to share in live conversations over the phone, in comparison to sending physical or digital images to people in the post or by email: "When you send a photo by email, you are not usually chatting to the person are you? One participant likened it to sharing a physical photo album with friends and family: "You can talk and share at the same time. Its like talking with your photo album". The familiar interface was also perceived to be easy to use: "As far as computers are concerned my wife doesn't want to know. But if you give her a phone like that and she could slide the photograph in say, and do exactly what you did then, I mean for those sort of people it will be beautiful".

PC users brought up issues regarding the method of transmission, as they felt it would affect the adoption of the product: "So you've got to have broadband to operate it don't you? You can't use ordinary telephone line, can you? Because for the people that haven't got computers, that would be what they would need because they haven't got broadband". Interestingly, Non-PC users didn't think of this barrier, but wanted to ensure that the device could store both shared photos and multimedia voicemail messages. This was because they didn't have any other computing device on which to keep such digital content. The idea of being able to scan not just photographs but bigger sized prints like A4 documents, greeting cards or newspaper articles was also discussed by both groups,

The results of the re-designed concepts are shown in Figures 4 and 5. The Non-PC group essentially re-designed Photo Phone to be a more general purpose *Photo answerphone with handset scanner* (Figure 4). This gave the device further voicemail and storage features, as well as allowing a wider variety of images to be captured from a camera in the

earpiece end of the handset. Hence, the device was given a large memory where sent or received photos or phone-voice messages were saved by default. A DVD reader/writer was incorporated to allow photos or photo-messages to be accessed from or burned onto a DVD. They also added an option for dialing a voicemail box directly to leave a photo-message, so as not to disturb recipients at inconvenient times. Having a delete and security function was also important to Non-PC users, to get rid of what they termed “unsavoury or naughty” content and block unwanted callers. Finally, they wanted to make and receive calls hands-free. Not only does this functionality help prevent the strain of holding a handset for a long time and enable the caller to multitask, it also allows more than one person to join the conversation. They also added voice activation to augment the hands-free functionality and allow the number of buttons on the phone to be reduced.

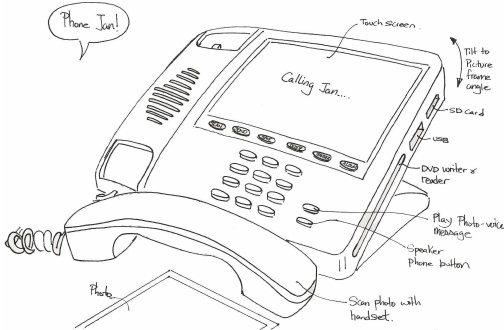


Figure 4. Photo answerphone with handset scanner (Non-PC group).

The PC group, re-designed Photo Phone as a *Photo Hub* device for storing and sharing digital photographs with distant family and friends (see Figure 5). These participants preserved the primary function of the device as a telephone in its original form to support quick dial, audio amplifier, speaker and contact directory. The size of the touchscreen display was increased and with the ability to zoom into photos through gestures to view and discuss finer details in the photos. For people who have visually impairments and limited dexterity, big buttons on the device were added to make it easier to use. Being aware of possibilities for wireless transmission of content, the PC Group were less concerned about scanning physical photos, and specified wireless communication to other devices. This would allow photographs to be exchanged to and from smartphones, cameras, computers and even TVs. The ability to synchronise the phone screen with the TV was also added to allow local group viewing experiences on a much bigger display.

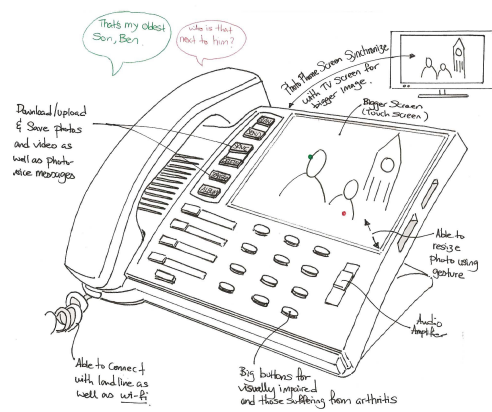


Fig. 5. Photo Hub (PC group)

5.2 Redesign of TV Talk

Participants generally liked the idea of TV Talk which was ranked second by both groups. It was seen as an excuse to socialise with distant family or friends, especially by those living alone: *“It would be nice to chat to my daughter watching this one thing a week. Perhaps we could make time because I can’t see her.”* However, only 43% of the Non-PC Group and 20% of the PC group were interested in buying it, reflecting ambivalence about its application to different TV and game content. For example, there was a feeling that chatting while watching TV works best with particular programmes such as documentaries, sports, cooking shows, music performances and reality TV shows. It was not felt suitable to watching dramas and films where there is a need to concentrate and become immersed in the fictional world. The idea of playing games remotely through the TV was popular with both groups. They elaborated on the scrabble example shown in the demonstration to request chess, tic-tac-toe (to play with younger family members), crossword puzzles and quizzes.

The Non-PC group made minor modifications to design of the remote control, which they preserved as the main interface to the application. Their *Enhanced TV Talk* remote is shown in Figure 6. This was given a larger integral display which one visually impaired participant suggested could also be relayed to the TV itself at even larger scale. Besides showing what channel and TV programme their friends or family members are currently watching, this group also wanted a full TV guide and schedule to be shown as well. This would allow them to plan ahead, see what others are planning to watch, make appointments with others and organise invitations to be circulated. The group also designed an ability to watch recorded TV programmes with others and were interested in using it for home learning where video-based lessons could be discussed with fellow students or tutors.

The PC group moved away from the TV-remote control interface and designed a *TV Talk app* for smart phones (see Figure 7). This could be used together with the TV when at home or independently when on the move. In the home scenario, the app interface can appear on the TV as well as

on the phone. Voice control was suggested as an option to operate the device, using the example: “Who is watching Blue Planet on BBC2?” with the reply from the mobile phone being “Jane and Peter” and the user could say “Join Jane and Peter”. As in the Non-PC group, this group wanted a schedule and calendar function to allow people to make appointments to watch either broadcast TV or recorded programmes together. Programme libraries could link recordings with friends sharing the same hobbies or interests and recommend watching sessions. This was further extended to home video clips which could then be shared within a distributed family or friendship group.

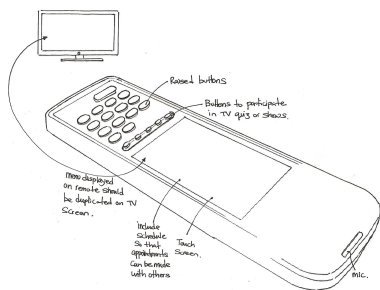


Figure 6. Enhanced TV Talk (Non-PC Group)



Fig. 7. TV Talk App (PC Group)

5.3 Redesign of Twitter Well

Although participants found the concept of Twitter Well interesting, most could not see the point of it and ranked it bottom, with only one member of each group saying they would buy it. Only two PC users and one Non-PC user understood the concept of social networking and therefore what Twitter Well was trying to achieve. Many participants found it impersonal: “*I think it’s taking the personal touch away. They are not communicating face to face*”. Others were uncomfortable with the open nature of communication where many people could read a posted message. They were also concerned with privacy and account safety issues. Aesthetically, both groups did not like the test-tube form which they described as looking like medical specimen jars. Glass was considered dangerous for older people to handle and there was concern over the amount of space multiple test tubes would take up in the home.

Given this overwhelmingly negative reaction to Twitter Well it was not surprising to find that both groups re-purposed its form and function in the re-design exercise. The Non-PC group designed a kind of private text messaging system called *Connect Blocs* as shown in Figure 8. Single line displays were preserved as channels of text communication with special contacts, but re-imagined as flat coloured strips that interacted with a docking mat. These could be arranged to the left of a keyboard in a physical distribution list for outgoing messages. Besides blocs that represent ‘friends’, it was suggested that there might be blocs for organisations such as Reuters, Hello magazine or Saga which could provide news feeds, celebrity gossip, latest offers or lifestyle advice.

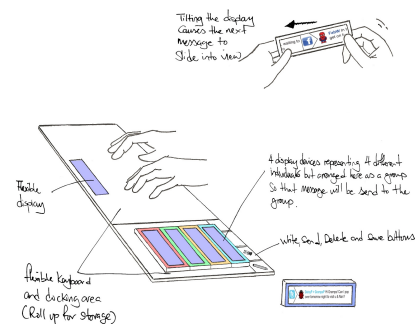


Figure 8. Connect Blocs (Non-PC Group)

Participants from the PC group turned Twitter Well into a *Network care* device for use primarily in care homes and sheltered accommodation (see Figure 9). This allowed family, friends or wardens to check on their older family members or clients, through short text or voice messages. It was designed as a stand-alone device with a mic, speaker, display and stock answer buttons (for example “I’m fine today”), which are programmable. When new messages appear, the recipient will be informed with a glow as well as a buzzer sound. The keyboard was dropped as an interface since participants felt that it would be easier and faster for an older person to speak rather than to fiddle around with keys and buttons. To reply, the user could press a stock answer button or alternatively compose a voice message to the sender.

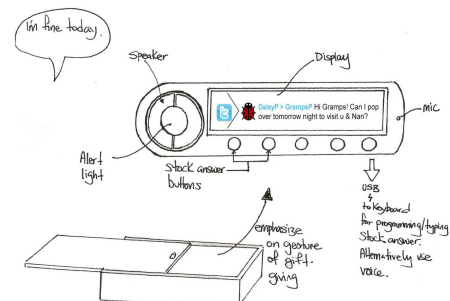


Figure 9. Network care (PC Group)

6. DISCUSSION

The findings above confirm a number of insights from previous work on social media systems for older people. First, we have seen how our participants have expressed a preference for supporting **strong tie relationships** in their own designs. These designs embraced and extended the *Photo Phone* concept for photo sharing with family and friends, and also elaborated the *TV Talk* concept for this group, assuming the content was suitable for live discussion. Although they rejected *Twitter Well* as a method for communicating with grandchildren or friends, this was related to confusion or dislike of the idea of broadcasting messages to a wide network of contacts – as in most social networking systems. This was re-purposed into two targeted group text messaging systems for more private communication with particular close contacts. Second, we observed great enthusiasm for **photo-based communication** on *Photo Phone* similar to that explored by [19, 23, 26 and 27]. However, this was due to the attraction of photo-conferencing and multimedia voicemail, compared with the photo display with text annotation supported by *Enmesh* [26, 27] for example. Further preferences for voice over text communication were expressed in the *Network Care* device. Third, there was interest in multi-player gaming through *TV Talk* and its variants, but mainly as a form of **playful communication** similar to that found with *Wayve* [19].

In addition, our findings go beyond previous work in revealing the **diversity** of skills, attitudes and desires of older people towards communication technology, and in challenging the goal of identifying a single design solution for this group. Familiarity with previous technology influenced design preferences and choices as predicted, but this differed radically between PC and Non-PC groups. Whereas both groups were familiar with the analogue starting points of our own three product concepts, many members of the PC group also had tablets and smartphones, and understood the possibilities afforded by remote storage, the world wide web and wireless networking. This was dramatically illustrated in their design of *Photo Hub* which could receive and send photographs from a variety of home devices over wi fi, and for the *TV Talk App*, which could work somewhat independently of the TV to establish voice calls based on TV watching information. Furthermore, there was a strong desire beyond familiarity, to design technology which fit with an individuals' existing technology **infrastructure**, and not to duplicate technology unnecessarily. Hence, PC users here and in our other studies sometimes re-designed appliance functions to reside on their general purpose devices [c.f. 5, 16].

This diversity suggests a more radical and **bespoke** approach to design for older people, in which users select which platform they would like to use for which new function being offered, or at least the range of platforms they have available to use as hosts. This should not preclude the invention of new platforms such as the ones we have suggested here, but rather

diversify the way in which digital services are commissioned, designed and customised to different people and infrastructures. This is a new approach to inclusive design, and indeed to mass produced design in general, which will require new ways of working with smaller communities of users to co-design and co-produce more crafted and personalised products [6].

In this respect, our study has demonstrated the value of conceptual re-design as a way of involving older people in the early stages of inclusive design. Participants themselves were surprised with how far this took them into the issues and practice of design itself, and all enjoyed the chance to be creative as well as critical in the focus group setting. The level of PC knowledge and engagement affected participation in this process across the two user groups. PC users were more articulate and confident about their design ideas, but tended to concentrate on technical details and the implementation of features in their discussions. Non-PC users were initially more reticent to modify designs and less knowledgeable about what was technically possible, but consequently tended to explore the functionality and value of ideas more thoroughly. Both groups came up with very creative modifications and extensions to our initial ideas, as shown in the re-designs of Figures 5 to 9.

We believe this is an advance on pure brainstorming techniques which provide too little design foundation for technologically naïve users, and focus group discussions which stop short of concerted re-design itself [c.f. 5]. The limited time available in which to come up with new designs could be addressed in future work by stretching this over several sessions. Design envisionment should also be followed by implementation and testing as shown in the intervention studies of Section 2. The results of those studies together with our findings suggest that there is great interest by older people in simple forms of image, voice and text-based messaging with small numbers of social contacts, to support rather than replace off-line social interaction.

7. Conclusion

To design social media technologies that are inclusive, designers and engineers not only have to consider older people's changing capabilities and prior experience, but also their different technological infrastructure and skills. This study has demonstrated one way of doing this, by working with both digitally engaged and digitally unengaged groups of older people, and inviting them to re-design product concepts at early stages of design. This has revealed an underlying interest in remote communication with close family and friends, through a diversity of functions, interfaces and devices.

8. Acknowledgements

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